The Role of Club Goods in Overcoming Childhood Obesity

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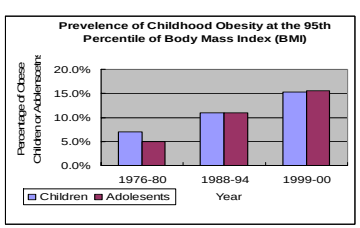
Abstract

The international prevalence of childhood obesity, obesity-related diseases and unfavorable social problems is gaining increasing attention. Individual physical and psychological health and social and economic development are impacted. By proposing a new two-dimensional classification scheme, we examine childhood obesity related issues. From the perspective of club goods, the relationships between childhood obesity and the family, school and community are discussed. An Ordinary Least Squares regression model has been applied to CDC data, and the results suggest that in addition to a child's daily activities, parents education, school type and community have significant influences on a child's Body Mass Index (BMI).

Introduction

Childhood obesity is on the rise. In the U.S. the percentage of obese children increased over 200% between 1976 and 2000. The percentage of obese adolescents increased 121% (American Obesity Association, 2004).

Figure 1: The Prevalence of Childhood Obesity



Childhood obesity is linked to adult obesity and can be accompanied by adverse health problems (Bouchard 1997). Overweight and obese children are often diagnosed with Type 2 diabetes and heart disease (Dietz 2004).

Literature Review

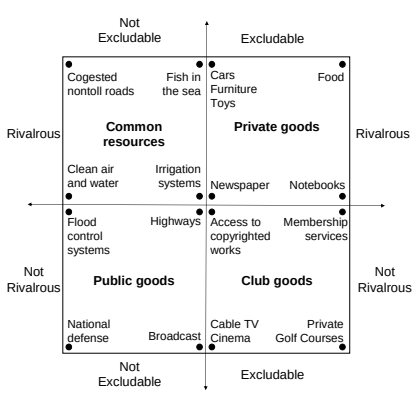
Initial club goods research focused on congested roads (Pigou 1920; Knight 1924). In order to fill in the 'Samuelsonian gap' (Samuelson 1954), Buchanan (1965) explored the role of exclusion devices. Applications have included telephone systems (Artle and Averous 1973) and other shared facilities (Scotchmer 1985).

Many factors influence childhood obesity. Children who eat large volumes of fast food take in more energy than those who do not (Paeratukul et al. 2003). Zakus (1982) suggests less than 5 percent of childhood obesity cases are due to endocrinological or neurological syndromes. Yet 25 to 40 percent of BMI is inherited (WHO 1997).

Coordinate Categorization Scheme

We propose a new classification scheme using a two-dimensional Cartesian plane to categorize goods. Each attribute of excludability and rivalry is considered as a continuum. Excludability means preventing another person from consuming the good. Rivalry means one person's consumption of the good does not decrease another person's. When combined, they form four quadrants each representing one category: club goods, private goods, common pool resources and public goods.

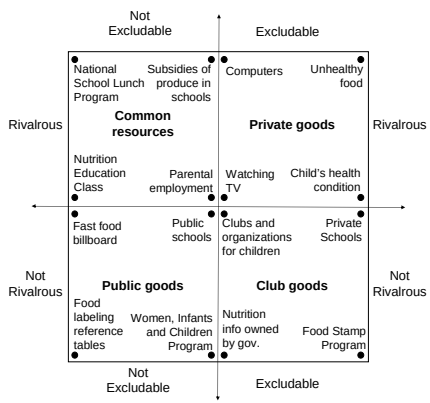
Figure 2: Applying the Coordinate Scheme



Analyzing Childhood Obesity

A club good approach to childhood obesity provides a foundation for more effective policy making.

Figure 3: Applying the Four Quadrants Classification Scheme to Childhood Obesity



Model and Sample Data

BMI is a common measure of evaluating overweight and obesity. It is defined as weight in kilograms divided by height in meters squared.

Although there are problems using BMI in children who are still developing, it still provides a reasonable measure evaluating overweight and obesity in children and adolescents (Dietz and Bellizze 1999).

The following regression model is applied to the data:

$$BMI_i = \beta_0 + \beta_1 age_i + \beta_2 male_i + \beta_3 health_i + \beta_4 edu_i + \beta_5 lang_i + \beta_6 school_i + \beta_7 sports_i + \beta_8 orga_i + \beta_9 exer_i + \beta_{10} computer_i + \beta_{11} TV_i + \beta_{12} eating_i + \beta_{13} exerpar_i + \beta_{14} smoke_i + \beta_{15} employ_i + \beta_{16} poverty_i + \varepsilon_i$$

Data are from a national survey conducted by the Centers for Disease Control and Prevention (CDC) in 2003 and 2004 with 27,259 observations of children aged 6 to 17.

Results

Table 1: Estimation Results

Variable	Variable Description	Parameter Estimate	Standard Deviation	t Value	Pr > |t|
constant	Intercept	19.79	0.17	113.82**	<.0001
age	Age of Selected Child (SC)	0.42	0.006	70.93**	<.0001
male	=1 if male, 0 if female	0.76	0.04	18.74**	<.0001
edu	Parents' highest level of education obtained	-0.51	0.05	-11.08**	<.0001
lang	The primary language spoken at home	0.06	0.11	0.57	0.5707
health	Selected child's health	-0.63	0.03	-22.95**	<.0001
school	Current school enrolled	0.18	0.06	2.83**	0.0046
sports	=1 if SC is on a sports team or taking sports lessons, o/w =0	-0.52	0.04	-11.71**	<.0001
orga	=1 if SC participates in any clubs or organizations, o/w =0	0.1	0.04	2.39**	0.0169
exer	Days in past week SC exercises	-0.09	0.01	-10.30**	<.0001
computer	Hours of SC's using a computer	-0.003	0.001	-1.76*	0.0788
TV	Hours of SC's usually watching TV or videos	0.01	0.002	-5.56**	<.0001
eating	Parent's concerns about SC's eating disorders	0.98	0.03	30.70**	<.0001
exerpar	=1 if SC's either parent regularly exercises, o/w =0	-0.06	0.04	-1.64	0.1019
smoke	Anyone using cigarettes, cigars, or pipe tobacco	0.43	0.04	9.84 **	<.0001
employ	Anyone in the household employed at least 50 out of the past 52 weeks,	0.01	0.08	0.18	0.8555
poverty	Derived poverty level of this household based on DHHS guidelines	-0.14	0.01	-13.80**	<.0001

**: significant at the 95% confidence level, *: significant at the 90% confidence level

Children and adolescents attending public schools have a mean BMI 0.26 higher than those attending private schools.

Participation in a club or organization in spare time is significant and negative, lowering BMI by 0.1.

Concluding Remarks

Applying a club good approach allows direct and indirect control measures effecting childhood obesity to be evaluated. A child's behavioral choices are impacted by: parental education, diet selection and daily activity. School type, collaboration between government and schools in designing and implementing wellness curricula and providing access to clubs and organizations which help share health information and encourage physical exercise can help reduce childhood obesity.